

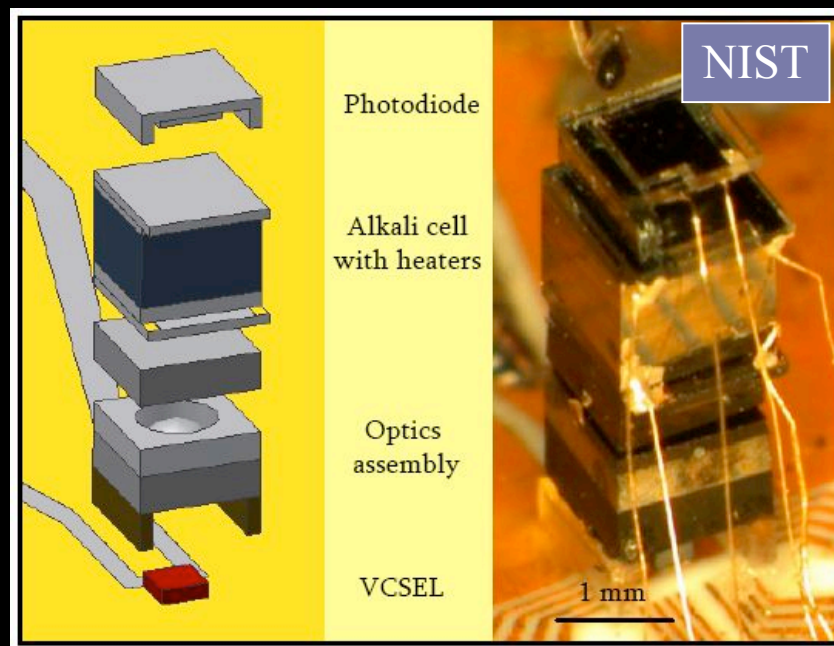
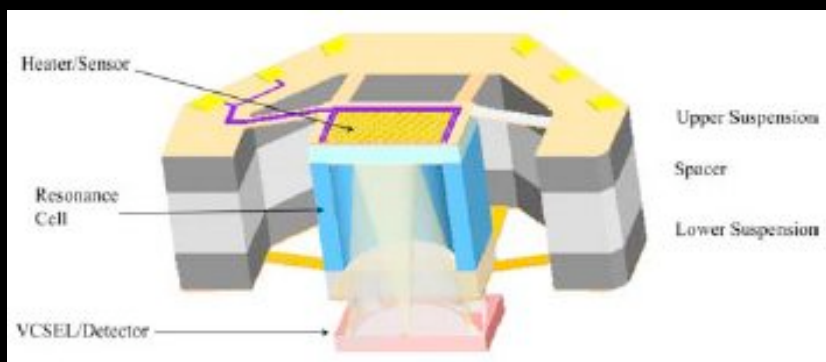
Development of a Prototype Atomic Clock Based on Coherent Population Trapping

Nathan Belcher

REU Midterm Talk

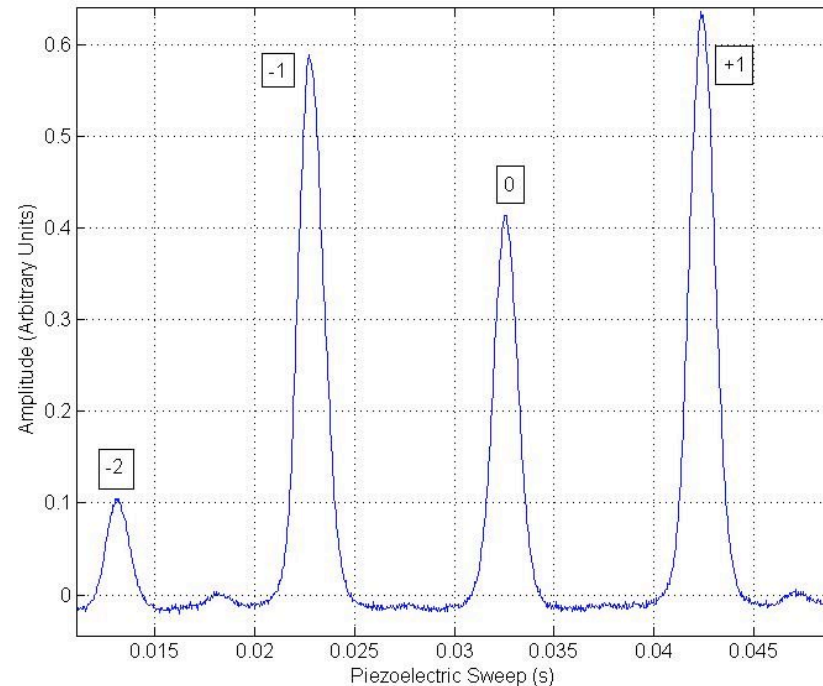
7.1.08

Miniature Atomic Clocks



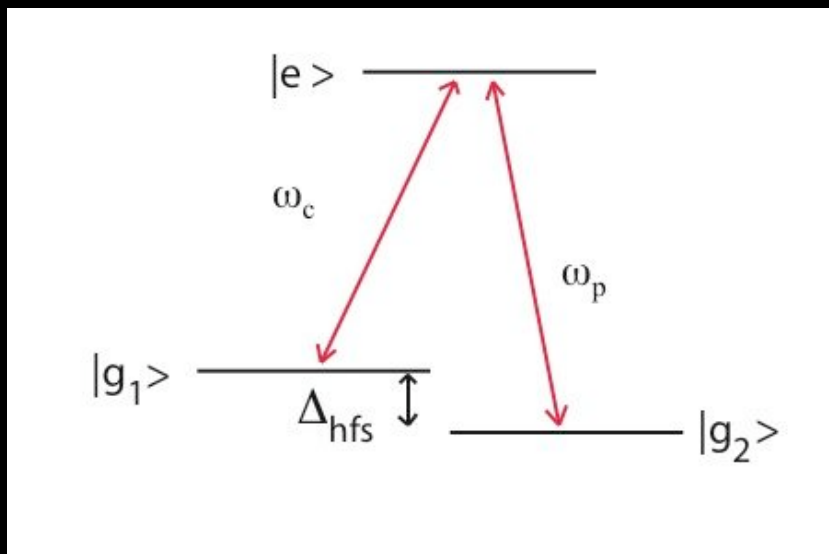
Phase Modulation

- Apply rf field to laser, create carrier and sideband comb

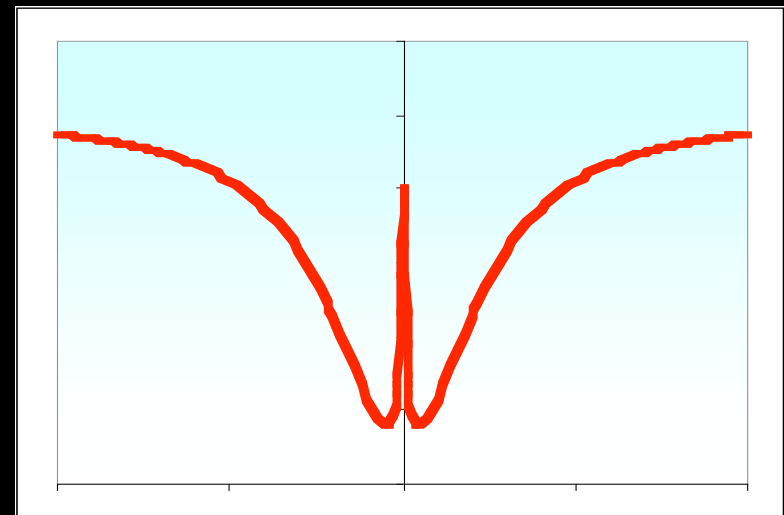


Review continued

- 3-level absorption and transmission



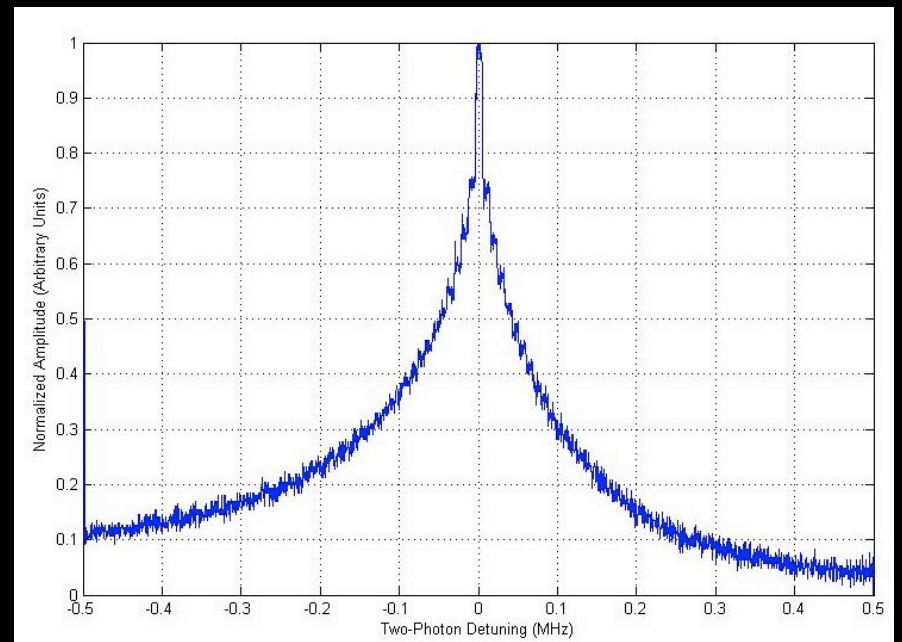
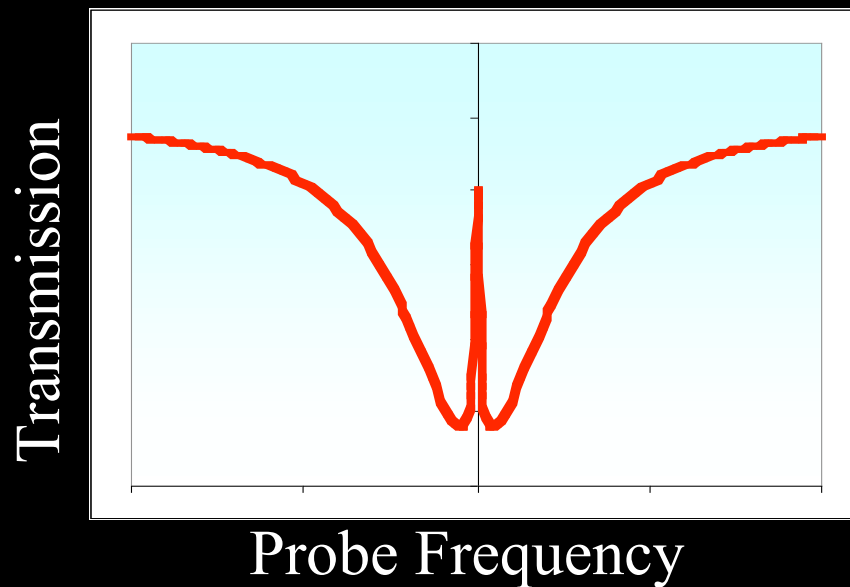
Transmission



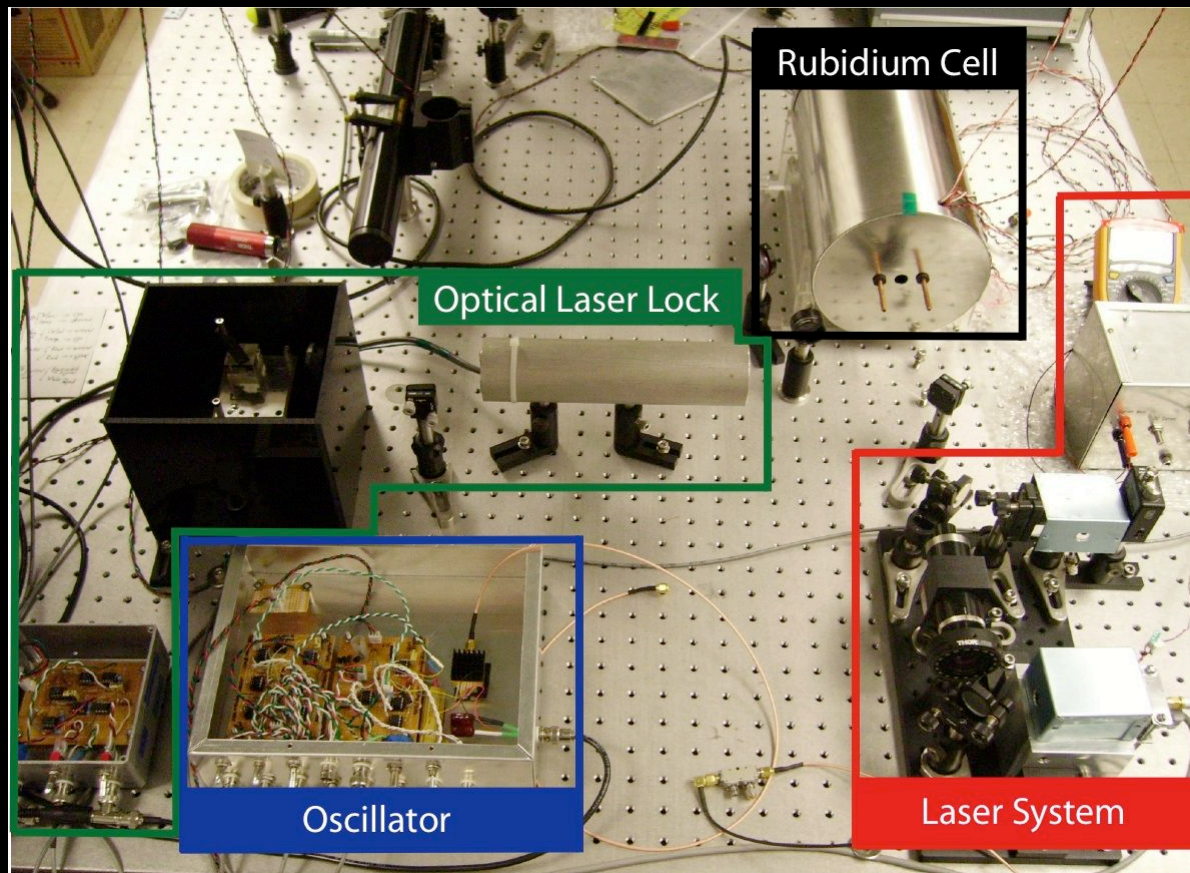
Probe Frequency

Our Goal

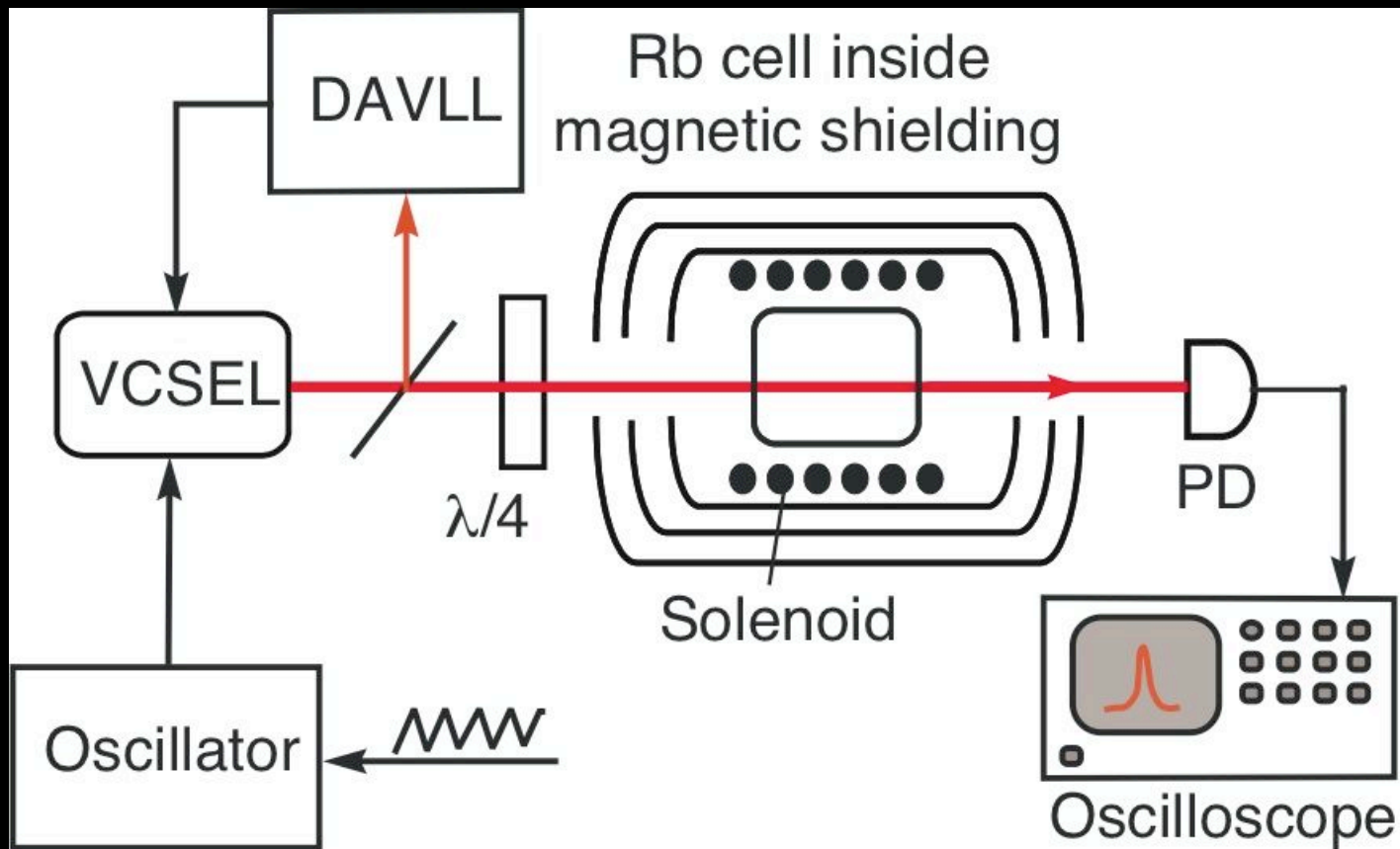
- Get lasers on optical and atomic resonance to achieve maximum transmission



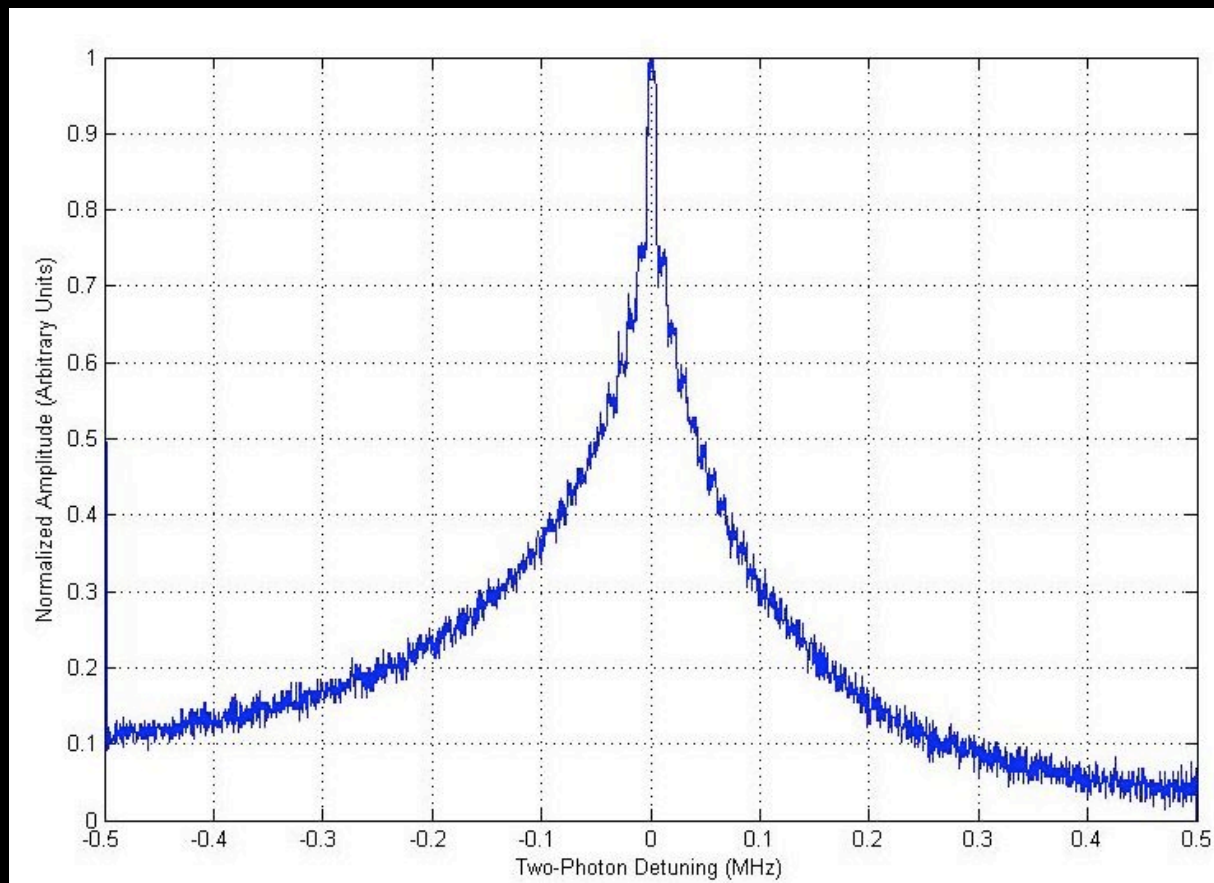
The Clock Experiment



CPT Experiment



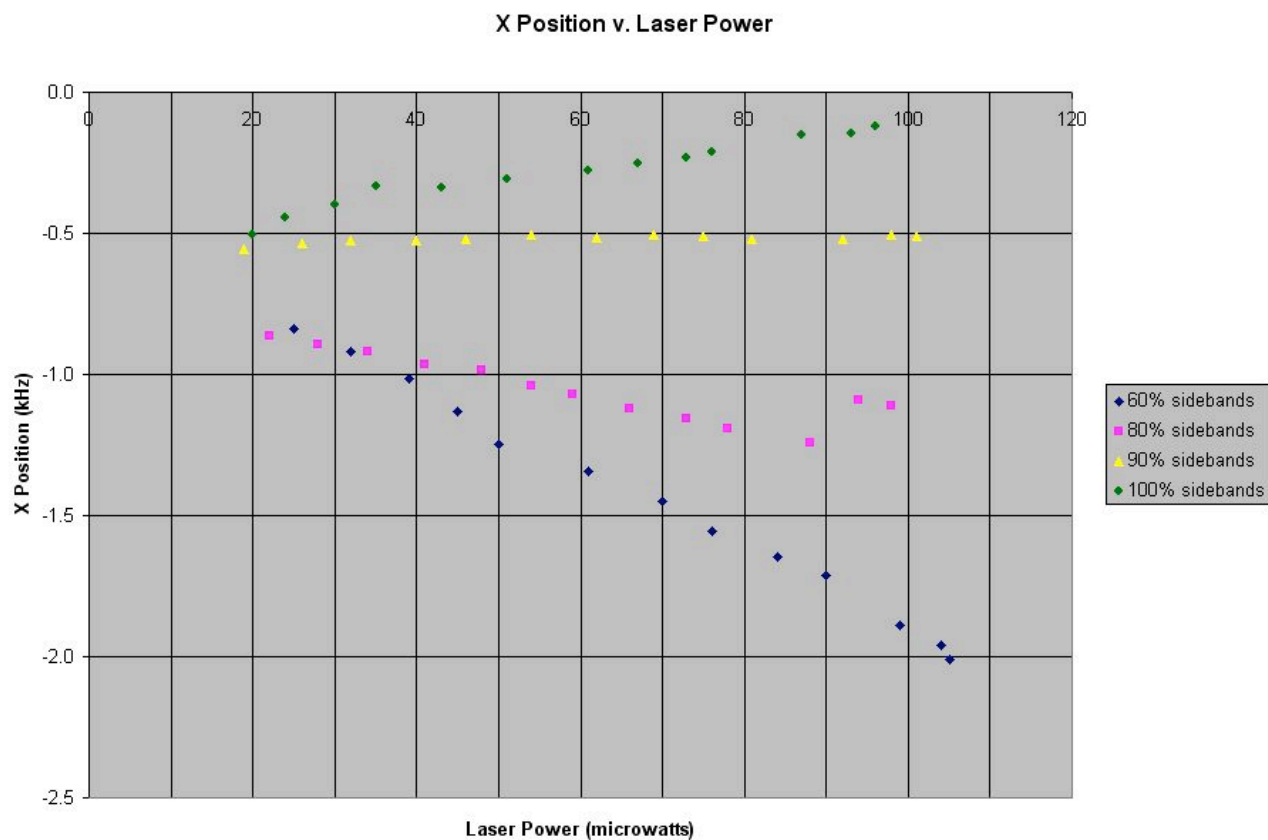
CPT Experiment Continued



Experimental Parameters

- Temperature of rubidium cell
- Sideband-to-carrier ratio
- Laser power

Preliminary Results



Conclusion

- 90% sidebands at 45° C rubidium cell temperature are the right parameters to use in clock
- Hope to see improvement in long-term stability of clock when using these parameters